

## **SAMPLE COLLECTION PROCEDURES FOR DETECTING ENTERIC VIRUSES IN WATER**

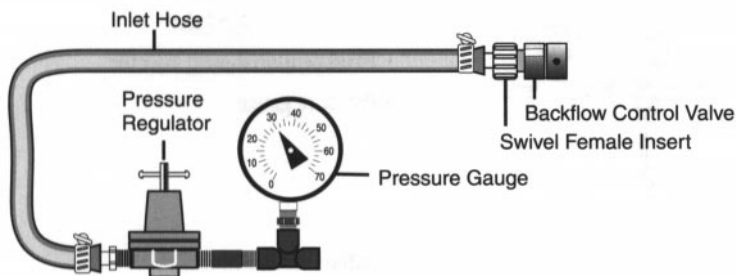
---

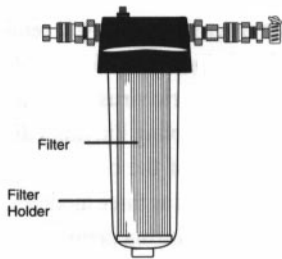


1

Each month, your laboratory will send you all of the equipment needed to collect samples for enteric virus analyses. When you receive the sampling kit, immediately check the contents of the carton. The sampling kit will be shipped as three modules, and should contain the following items:

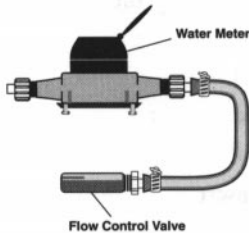
- ☐ Plastic sample bags
- ☐ Ice packs for shipping the collected samples
- ☐ Sample data sheet
- ☐ Regulator Module (below):
  - Backflow control valve
  - Swivel female insert
  - Inlet hose
  - Pressure regulator with pressure gauge





☐ Cartridge Housing Module:

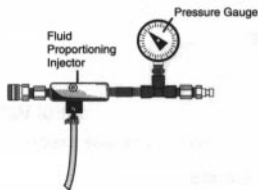
- 1-MDS Zetapor Virosorb filter inside a filter holder



☐ Discharge Module:

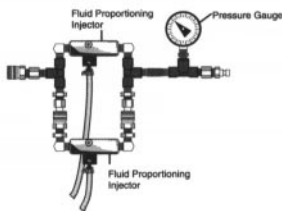
- Water meter
- Flow control valve

The laboratory will also ship three additional modular sections, as required by your facility. These may include:



☐ Single Injector Module:

- Fluid proportioning injector
- Pressure gauge



☐ Double Injector Module:

- Two fluid proportioning injectors, in parallel
- Pressure gauge

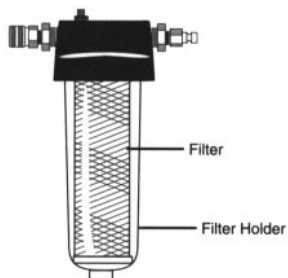
❏ Prefilter Module:

- 10  $\mu\text{m}$  polypropylene filter inside a filter holder

**!** The ends of each module should be wrapped in foil to ensure that the equipment remains free of contamination. If your modules are unprotected or compromised, please contact your laboratory immediately for further instructions.

If you are missing any items, contact your laboratory immediately. Do not attempt to collect the samples without a complete sampling kit.

Once you have verified the contents of the sampling kit, place the ice packs in the freezer and repack the box.



## COLLECTING SOURCE WATER SAMPLES

---

When you are ready to collect your virus sample, bring the following items with you to the sampling location:

- ☐ Shipping container sent by the laboratory
- ☐ Regulator Module
- ☐ Cartridge Housing Module
- ☐ Discharge Module
- ☐ Single Injector Module (for adding 0.1-molar hydrochloric acid to adjust pH, if necessary)
- ☐ Prefilter Module (for filtering sediment from highly turbid water, if necessary)
- ☐ Approximately 2 gal (4 L) of 0.1-molar hydrochloric acid solution (for adjusting pH, if necessary)
- ☐ Sterile, 250- or 500-mL graduated cylinder
- ☐ Plastic sample bags
- ☐ Sample data sheet
- ☐ Frozen ice packs
- ☐ Several pairs of new latex gloves
- ☐ pH meter
- ☐ Thermometer
- ☐ Turbidimeter



**2**

Turn on the water at the tap and allow the water to flow for 2 to 3 minutes or until any debris that has accumulated in the sampling line has cleared or the turbidity in the water becomes uniform.

**3**

Put on new latex gloves to prevent contamination from outside sources. Sterile technique must be used when sampling for enteric viruses. Any contamination of the sampling apparatus may bias the final results.

Turn off the water at the tap.

Remove the foil from the backflow regulator on the Regulator Module and connect it to the water tap or to an extension hose connected to the tap.

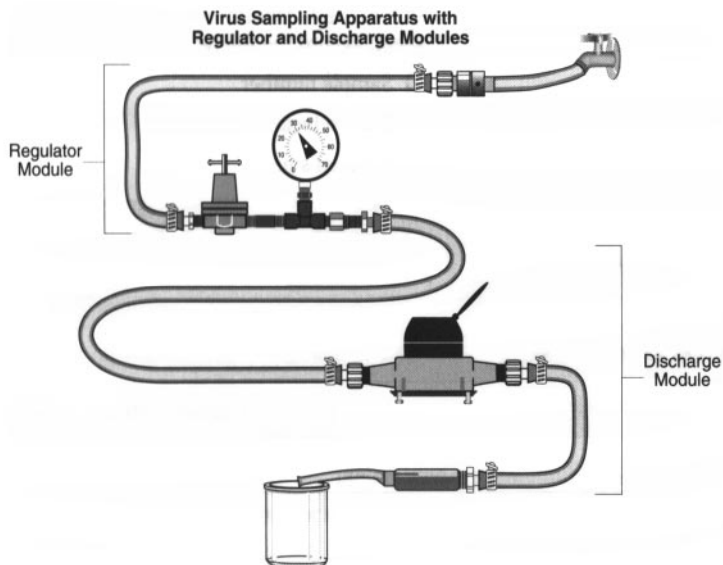
Remove the foil from the other end of the Regulator Module and from the Discharge Module. Connect the Discharge Module to the Regulator Module.

Place the end of the Discharge Module, or an extension hose connected to the Discharge Module, into a 1-liter plastic bottle.

Note the water meter reading, then slowly turn on the water.

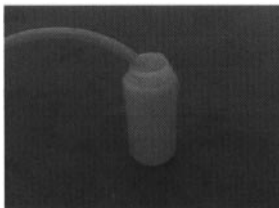
Using the pressure regulator, adjust the water pressure to no more than 30 psi.





**4**

Flush the sampling apparatus with 20 gallons / 76 liters of water by allowing the water to flow through the system, out the effluent hose into the 1-liter plastic bottle.



Sampling Step	Volume In GALLONS	Volume In LITERS	Volume In FT <sup>3</sup>
System Flush	20	76	2.7

While the water is flushing the sampling apparatus, begin completing your sample data sheet. Record the following information:

- ☐ Sample number
- ☐ System location
- ☐ Sampler's name

SAMPLE DATA SHEET			
SAMPLE NUMBER:			
SYSTEM LOCATION:			
SAMPLER'S NAME:			
WATER pH:	WATER TEMPERATURE:	°C	TURBIDITY: NTU
INIT. METER READING:	(CHECK UNITS)		__ft <sup>3</sup> __gallons
date:	time:		
FINAL METER READING:	(CHECK UNITS)		__ft <sup>3</sup> __gallons
date:	time:		
TOTAL SAMPLE VOLUME:			liters
(Final-Initial meter readings x 28.316 (for readings in ft <sup>3</sup> ) or x 3.7854 (for readings in gallons))			
CONDITION ON ARRIVAL:			
COMMENTS:			



5

Measure the pH, temperature, and turbidity of the source water flowing from the effluent hose. Record the readings on the sample data sheet.



SAMPLE DATA SHEET			
SAMPLE NUMBER:			
SYSTEM LOCATION:			
SAMPLER'S NAME:			
WATER pH:	WATER TEMPERATURE:	°C	TURBIDITY: NTU
INIT. METER READING:	(CHECK UNITS)		__ft <sup>3</sup> __gallons
date:	time:		
FINAL METER READING:	(CHECK UNITS)		__ft <sup>3</sup> __gallons
date:	time:		
TOTAL SAMPLE VOLUME:			liters
(Final-Initial meter readings x 28.316 (for readings in ft <sup>3</sup> ) or x 3.7854 (for readings in gallons))			
CONDITION ON ARRIVAL:			
COMMENTS:			



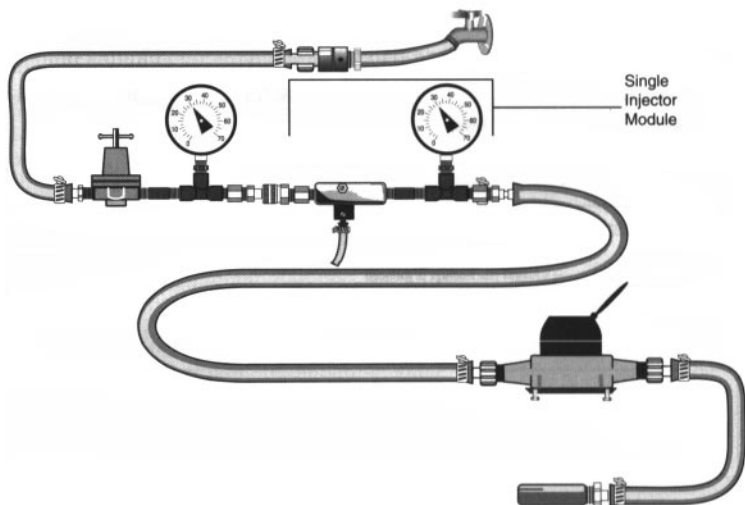
6

Turn off the water at the tap and decide whether you need to insert additional modules into the sampling train.

For source water sampling, you may need to use the Single Injector Module and/or the Pre-filter Module.

First, determine if you need to use the Single Injector Module.

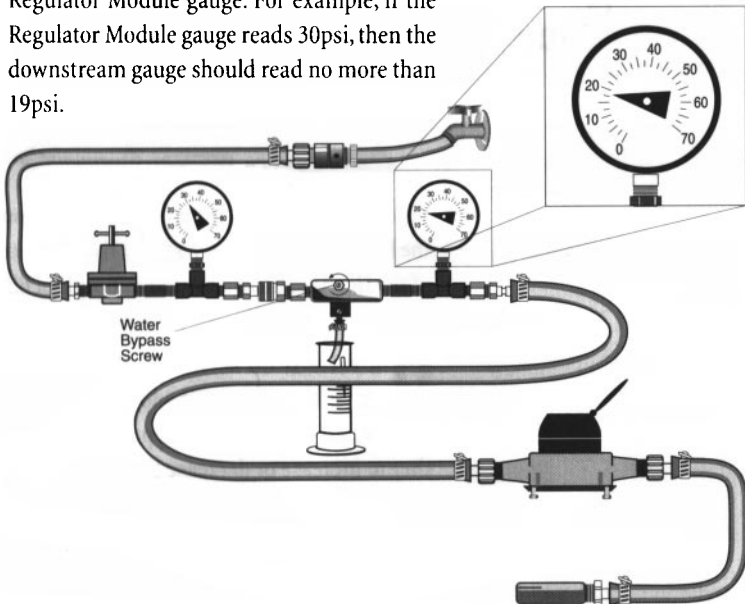
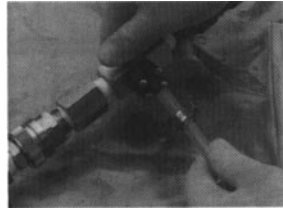
If your pH value is greater than 8.0, you need to insert the Single Injector Module between the Regulator and Discharge Modules before proceeding.

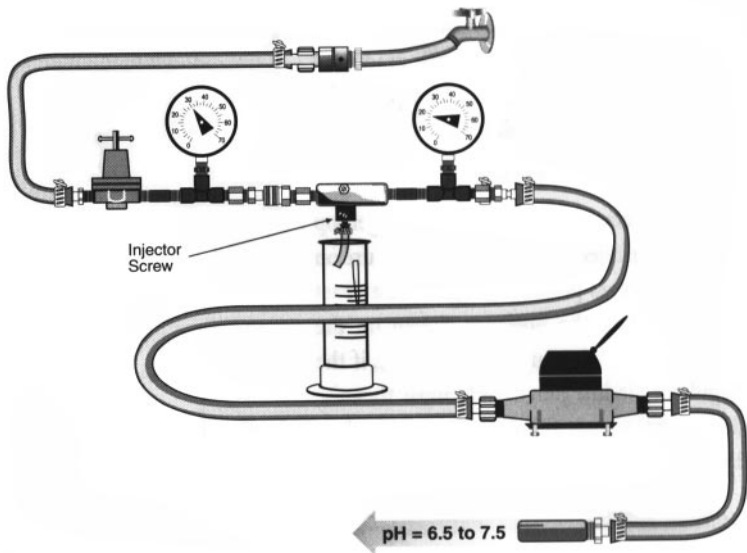


Using aseptic technique, connect the sterile tubing to the injector. Fill the sterile graduated cylinder with 0.1-molar HCl and place the tube in the graduated cylinder.

Turn on the water at the tap.

Using the water bypass screw—the larger top screw in the injector—adjust the pressure on the downstream pressure gauge to be at least 35% less than the pressure shown on the Regulator Module gauge. For example, if the Regulator Module gauge reads 30psi, then the downstream gauge should read no more than 19psi.





Adjust the smaller injector screw, located on the bottom of the injector, so that the flow rate of the HCl is sufficient to maintain a pH of 6.5 to 7.5.



If there is no suction visibly drawing down the HCl, or if too much HCl is flowing, adjust the water bypass screw further to increase or decrease the pressure differential between the two gauges. A greater differential between the upstream gauges increases the flow rate; a smaller differential decreases the flow rate.

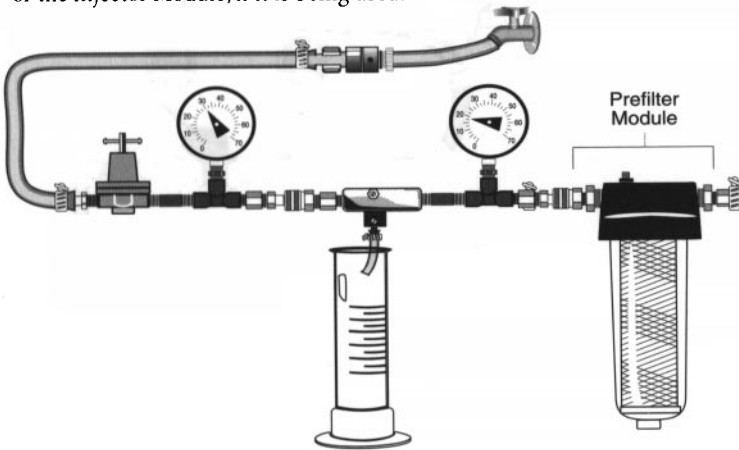
After the HCl flow rate is adjusted properly, transfer the injector tube to a carboy of HCl. Periodically check the pH to ensure that sufficient HCl is being added to maintain a pH of 6.5 to 7.5.

Record the adjusted pH on the Sample Data Sheet.

Next, determine if you need to use the Prefilter Module.

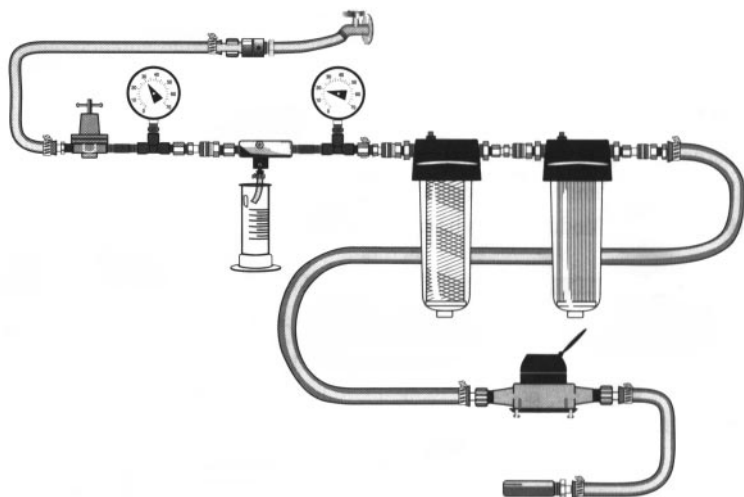
Turn off the water at the tap, and note the turbidity. If the turbidity is greater than 75 NTU, or for conditions where the 1-MDS filter is expected to clog before sampling is completed, you will need to use the Prefilter Module.

Disconnect the Discharge Module and connect the Prefilter Module to the Regulator Module or the Injector Module, if it is being used.





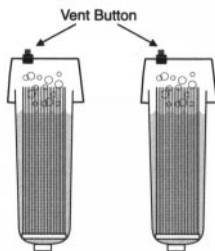
**7** Connect the Cartridge Housing Module containing the 1-MDS filter to the Pre-filter Module. Then, reconnect the Discharge Module to the outlet end of the Cartridge Housing Module.



Record the following information on the Sample Data Sheet:

- ☐ Date sampling started
- ☐ Time sampling started
- ☐ Initial water meter reading (including units)

SAMPLE DATA SHEET			
SAMPLE NUMBER:			
SYSTEM LOCATION:			
SAMPLER'S NAME:			
WATER pH:	WATER TEMPERATURE:	°C	TURBIDITY: NTU
INIT. METER READING:	(CHECK UNITS)	__ft <sup>3</sup>	__gallons
date:	time:		
FINAL METER READING:	(CHECK UNITS)	__ft <sup>3</sup>	__gallons
date:	time:		
TOTAL SAMPLE VOLUME:		__liters	
(Final-Initial meter readings x 28.316 (for readings in ft <sup>3</sup> ) or x 3.7854 (for readings in gallons))			
CONDITION ON ARRIVAL:			
COMMENTS:			


**8**

Slowly, start the water flowing through the sampling apparatus.

Push the red vent buttons on top of the filter housings to expel air in the filters. When the air is totally expelled from the filters, release the button and open the water tap completely.

Using the pressure regulator on the Regulator Module, adjust the pressure regulator to no more than 30 psi.

Using the water bypass screw on the injector, adjust the pressure regulator on the Single Injector Module to be at least 35% less than the pressure shown on the Regulator Module gauge.

Allow 53 - 80 gallons / 200 - 300 liters of water to pass through the filter.

Sampling Step	Volume In GALLONS	Volume In LITERS	Volume In FT <sup>3</sup>
Sampling Source Water	53 - 80	200 - 300	7 - 11



If the virus filter clogs before 53 gallons / 100 liters are collected, contact the approved analyst at your laboratory for further instructions.

**9**

When the water meter indicates that 53 - 80 gallons / 200 - 300 liters of water have passed through the filter, turn off the water at the tap.



Record the following information on the Sample Data Sheet:

- ☐ Date sampling ended
- ☐ Time sampling ended
- ☐ Final water meter reading (including units)

SAMPLE DATA SHEET			
SAMPLE NUMBER:			
SYSTEM LOCATION:			
SAMPLER'S NAME:			
WATER pH:	WATER TEMPERATURE:	°C	TURBIDITY: NTU
INIT. METER READING:	(CHECK UNITS)		__ft <sup>3</sup> __gallons
date:	time:		
FINAL METER READING:	(CHECK UNITS)		__ft <sup>3</sup> __gallons
date:	time:		
TOTAL SAMPLE VOLUME:			liters
(Final-Initial meter readings x 28.316 (for readings in ft <sup>3</sup> ) or x 3.7854 (for readings in gallons))			
CONDITION ON ARRIVAL:			
COMMENTS:			



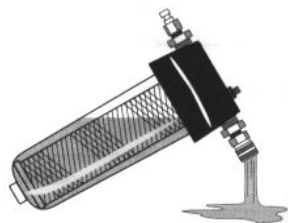
Put on fresh latex gloves.



Carefully, disconnect the sampling apparatus from the water tap.



Disconnect the Cartridge Housing Module from the sampling train.



Turn the filter housing upside down and allow excess water to flow out as waste water.



Turn the housing upright, and cover the module ends with sterile foil.



*Do not attempt* to open the filter housing.

If you are using the Prefilter Module, disconnect it from the sampling train, repeat the draining procedure, and cover the module ends with sterile foil.



The filters and filter housings are shipped to the laboratory intact. The Discharge Module may be retained at the utility and reused.

Place the filter housings into an insulated shipping box.

Set the ice packs around the housings.

Return the Regulator Module and the Injector Module to the laboratory for cleaning and sterilization.

Place the Sample Data Sheet in a plastic bag and pack it on top of the sampling apparatus.



You may need to use additional packing material to ensure that the contents of the box will not shift during transport.

**11**

Seal the container and ship it by overnight courier to the laboratory. Call the laboratory and notify them of the sample shipment.

